

Claims

1. A process for the manufacture of (all-*rac*)- α -tocopherol by the acid-catalyzed reaction of trimethylhydroquinone with isophytol or phytol, characterized by carrying out the reaction in the presence of methane trisulphonate as the catalyst in an organic solvent.
- 5 2. A process according to claim 1, wherein the solvent is a polar aprotic organic solvent such as a dialkyl or alkylene carbonate, e.g. dimethyl carbonate, diethyl carbonate, ethylene carbonate, propylene carbonate or 1,2-butylene carbonate; an aliphatic ester, e.g. butyl acetate; an aliphatic ketone, e.g. diethyl ketone; or a lactone, e.g. γ -butyrolactone; or a mixture of two or more of such solvents, or a two-phase solvent system comprising a
- 10 polar aprotic organic solvent, such as one or a mixture of several of the aforementioned, and a non-polar aprotic organic solvent, such as an alkane, e.g. hexane, heptane or octane.
3. A process according to claim 2, wherein the solvent is a biphasic solvent system comprising ethylene carbonate, propylene carbonate or 1,2-butylene carbonate, or a mixture of two or all three of these polar aprotic organic solvents, as the one solvent phase,
- 15 and hexane, heptane or octane as the other (non-polar aprotic organic solvent) solvent phase, especially a biphasic solvent system of ethylene carbonate and heptane, of propylene carbonate and heptane or of a mixture of ethylene and propylene carbonate and heptane.
4. A process according to claim 2 or claim 3, wherein the solvent is a biphasic solvent system of which the volume ratio of the non-polar aprotic organic solvent to the polar
- 20 aprotic organic solvent is in the range from about 1 : 10 to about 5 : 1, preferably 1 : 3 to about 5 : 1, most preferably from about 1 : 1.25 to about 2 : 1.
5. A process according to any one of claims 1 to 4, wherein the amount of the methane trisulphonate catalyst is about 0.01 mole % to about 0.1 mole %, preferably about 0.0125 mole % to about 0.08 mole %, of the amount of educt trimethylhydroquinone or
- 25 isophytol/phytol, whichever is in the lesser molar amount.
6. A process according to any one of claims 1 to 5, wherein the molar ratio of trimethylhydroquinone to isophytol or phytol is about 1.25 : 1 to about 2.2 : 1, preferably about 1.5 : 1 to about 2 : 1.
7. A process according to any one of claims 1 to 6, wherein the reaction is effected at
- 30 temperatures from about 80°C to about 160°C, preferably from about 90°C to about 150°C, especially from about 100°C to about 142°C.

8. A process according to any one of claims 1 to 7, wherein about 0.5-2 ml, preferably about 0.75-1.25 ml, most preferably about 0.9-1.1 ml, of a polar aprotic organic solvent are used per mmol of trimethylhydroquinone.

9. A process according to any one of claims 1 to 8, wherein the process is carried out
5 under an inert gas atmosphere, preferably gaseous nitrogen or argon.

10. A process according to any one of claims 1 to 9, wherein the process is carried out batchwise or continuously, and by adding isophytol or phytol, as such or in solution, portionwise to a mixture of the catalyst, the trimethylhydroquinone and the solvent.